Can peace be purchased? A sectoral-level analysis of aid's influence on transnational terrorism

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Abstract Does foreign aid reduce terrorism? We examine whether foreign aid decreases terrorism by analyzing whether aid targeted toward certain sectors is more effective than others. We use the most comprehensive databases on foreign aid and transnational terrorism—*AidData* and *ITERATE*—to provide a series of statistical tests. Our results show that foreign aid decreases terrorism especially when targeted toward sectors, such as education, health, civil society, and conflict prevention. These sector-level results indicate that foreign aid can be an effective instrument in fighting terrorism if allocated in appropriate ways.

Keywords Foreign aid · Sectoral aid and terrorism · Transnational terrorism · Panel analysis

JEL Classification F35 · D74

1 Introduction

In the aftermath of the September 11, 2001 attacks, the Bush Administration elevated foreign aid as a key instrument in the "War on Terror". Aid was repeatedly identified as a necessary policy option. In the 2002 State of the Union Address, for example, Bush argued that "[w]e have a great opportunity during the time of war to lead the world toward the values that will bring lasting peace".[1] His subsequent budget reflected this claim by including a nearly $750 million increase in foreign aid spending.[2]

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[1] Text of this address can be found online at http://en.wikisource.org/wiki/George_W._Bush%27s_Second_State_of_the_Union_Address.
[2] Critics argued that this increase was not enough (Epstein 2002).

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Similarly, other governments began relying on foreign aid as a policy tool to prevent terrorism. Following the recent flooding in Pakistan, the Pakistani foreign minister cited foreign aid as essential in preventing flood victims from supporting or engaging in terrorism (Varner 2010). Recent congressional hearings have also considered the efficacy of foreign aid in the fight against terrorism (U.S. Congress 2008).

Many have hoped that aid would help eradicate the conditions assumed to encourage terrorism, namely poverty, lack of education, and oppressive governments. Colin Powell declared in late 2002 "[a] shortage of economic opportunities is a ticket to despair. Combined with rigid political systems, it is a dangerous brew indeed" (Cornwell 2002). Others have subscribed to the belief that foreign aid strengthens recipient governments' counterterror measures because governments receiving aid have greater resources to invest in counterterrorism. The support for aid as a foreign policy tool clearly exists, but there is little systematic evidence on the conditions under which foreign aid is effective.

Recent academic work has begun to focus on the uses of foreign aid as a tool in combating terrorism. Formal models of the aid–terrorism process expect that aid can reduce terrorism if granted in targeted ways. The key logics underlying these arguments identify foreign aid's potential to promote human capital through education, thereby freeing up resources to complement existing counterterrorism efforts (Azam and Thelen 2008) or by reducing grievances that might motivate the use of violence (Bueno de Mesquita 2005). Moreover, donors tie foreign aid receipts to the counterterrorism efforts of recipient governments (Bandyopadhyay et al. 2011a), thereby more directly supporting or requiring counterterrorism.

Accompanying empirical tests have offered support for the pacifying effects of foreign aid (Azam and Delacroix 2006; Azam and Thelen 2008). Azam and Thelen (2010) even find that it is more effective than military intervention. Given these encouraging results, existing empirical analyses suffer from at least three weaknesses. First, despite making arguments about sectoral-level aid, all empirical tests aggregate each distinct type of aid. Thus, existing tests cannot differentiate among separate sectoral-level arguments, which leaves an unanswered question: are education and counterterrorism-tied aid uniquely able to reduce terrorism? Second, existing arguments make sector-level claims but ignore other sectors that could have substitutable effects. Health aid, for example, may serve a similar purpose as education aid in enhancing human capital and allowing greater resources to be invested into counterterrorism. Third, extant tests average both aid and terrorism data over time, which creates cross-sectional observations rather than time-series cross-sectional data. These tests thereby lose important temporal variation and increase the possibility for reverse effects in which terrorism might precede the allocation of aid.

The primary contribution of this article is empirical: we test a sectoral-level argument that captures many of the dynamics in previous studies using a large number of recipient countries (147) and a long temporal period (1973–2004). We begin by testing for a general aid and terrorism relationship using a measure of "aggregated aid" similar to past studies. Consistent with Azam and Delacroix (2006) and Azam and Thelen (2008, 2010), we find evidence of a general relationship between aid and terrorism. Given that diverse varieties of aid are aggregated into the overall measure, it is unclear what this result implies about the effects of different types of aid.

We then consider the untested argument specific to education aid by including separate measures for education aid and general budget aid. Next, we examine the potential substitutable effects of aid, such as health aid or aid tied to counterterrorism. We use aid information based on the most comprehensive development assistance database, *AidData* (Tierney et al. 2011), and we also move beyond the limited amounts of terrorism data used by Azam

and Delacroix (2006) and Azam and Thelen (2008) by using *ITERATE* (Mickolus et al. 2008) in the period from 1973–2004.[3] In contrast to Azam and Thelen (2010), we do not average all of the information in the data, even when using *ITERATE*. Finally, we address potential endogeneity.

The results indicate that several types of aid are effective at reducing terrorism. They thus offer some support for the theoretical arguments in past studies, including Azam and Thelen (2008) and Bandyopadhyay et al. (2011a). The findings also extend to other sectors of aid in which education aid may not offer unique theoretical leverage.

2 The aid–terrorism nexus

Terrorism is the premeditated or threatened use of extra-normal violence or force to obtain political, religious, or ideological objectives through the intimidation of a large audience beyond the immediate victims of violence (Enders and Sandler 2000, 2006). While most terrorism is domestic, transnational terrorism appears to be higher profile and have greater economic consequences (Gaibulloev and Sandler 2008). In the last decade, governments have struggled with how best to counter transnational terrorism, especially in the United States' *War on Terror*. Foreign aid quickly became one of the vital policy instruments used to battle terrorism and to ameliorate the negative consequences of terrorism in other sectors (Bandyopadhyay et al. 2011b). The appeal as a foreign policy instrument is intuitive: it is not overly expensive or time-consuming to increase foreign aid, other governments are often eager to obtain increased foreign aid revenues, and donors can quickly claim that they have taken action against a potential threat. The increase in foreign aid in recent years raises the question of whether aid is effective and under what conditions.

2.1 The non-effects of aid?

There are at least three credible claims suggesting that aid should not work (e.g., Atran 2003; Krueger 2008). First, aid may not have an effect on the factors that supposedly reduce terrorism (e.g., poverty). This leads to the more general question of whether foreign aid is effective. Economists have steered most of this discussion in an attempt to understand whether aid increases economic growth (e.g., Burnside and Dollar 2000), but they have few strong conclusions (Doucouliagos and Paldam 2009: 433). We do not review the aid effectiveness literature here, but rather note that most results suggest aid has no effect on desired outcomes. A large number of people inside and outside of the aid establishment have serious questions about whether aid is having much impact. If aid is not consequential, then this raises the question of whether aid could have an impact on terrorism. While the aid effectiveness literature is well established, surprisingly few studies disaggregate aid. Most donors specify fairly precise sectoral-level goals that they hope aid will achieve, however. It is unclear whether pessimistic findings of the general aid effectiveness literature apply to disaggregated aid.

Second, the factors that supposedly increase or decrease terrorism might not, in fact, have the posited effect. Assuming that aid succeeds in alleviating poverty, it is still unclear whether alleviating poverty would reduce terrorism. Based on recent studies, there

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[3]As a robustness check, we also assess the relationship using the Global Terrorism Database (GTD) for the same period (LaFree and Dugan 2006).

appears to be no direct connection between socioeconomic conditions and the individuals who participate in terrorism (Atran 2003; Hudson 1999; Krueger and Maleckova 2003; Russell and Miller 1983; Taylor 1988). Recent evidence suggests actual terrorist operatives are neither poor nor uneducated. Terrorist leaders are more likely to recruit educated, highly skilled individuals to run their various cells throughout the world. This implies that low levels of poverty or education in a country may not necessarily affect terrorist activities, and increased economic growth may not necessarily initiate a reduction in terrorist activities. Despite substantial support for the argument that education and poverty are not linked to terrorism, prominent arguments and empirical findings suggest that such conclusions are premature. Terrorism may be sensitive to certain economic conditions like economic opportunity costs (Blomberg et al. 2004; Drakos and Gofas 2004; Li 2005). Social ills, such as economic discrimination, may indeed encourage violence and more general mobilization of educated individuals within poor societies (Piazza 2011; Bueno de Mesquita 2005). Thus, aid could potentially serve a counterterrorism function with respect to some economic circumstances.

Finally, even if aid increases a recipient country's counterterror efforts, these actions could exacerbate terrorism. Most terrorist groups operate in opposition to the central government, and aid that increases the institutional capacity of or popular support for the government may be perceived as a strategic or cultural threat. As aid to the Palestinian government increased in the last decade, for example, there appears to have been a similar increase in terrorism related deaths against both Israelis and Palestinians, suggesting a reaction against Western support (Stotsky 2008). Furthermore, government counterterrorism efforts, especially if collateral damage is high or if social services are not provided well, could encourage more support for terrorist groups who would then use that support to produce more terrorism (Findley and Young 2007; Siqueira and Sandler 2006). Increased counterterrorism efforts could cut both ways: sometimes reducing terrorism, at other times increasing it. Although the blunt use of counterterrorism could encourage a backlash, it is possible that aid tied to counterterrorism activities could encourage a more judicious approach. If recipient governments use aid to repress their populations or initiate violence, then foreign aid donors may be less likely to grant future aid, thus necessitating more effective counterterrorism strategies.

While some arguments suggest that aid may not be effective, the evidence is mixed. Counterarguments suggest considering aid more closely at a sectoral-level to account for ways that aid targets specific economic, social, or security outcomes (see, for examples, Cassen 1986; White 1998).

2.2 Foreign aid and the reduction of terrorism

Donors provide foreign aid to recipients for a variety of reasons and with multiple objectives (Alesina and Dollar 2000; Isenman and Ehrenpreis 2003). Much of the aid is committed to certain sector-specific purposes, including fighting terrorism in other "venues" (Drakos and Gofas 2006) outside of the donor country. Despite the variety of motives and uses of aid, it is likely that aid has both indirect and direct effects on terrorism. Focusing on the more complete set of aid sectors potentially relevant to terrorism is crucial. Our ambition here is modest. We cannot formulate precise points of overlap and difference among all sectors of aid; such an endeavor would require systematic theorizing in a larger set of articles. Instead, we highlight general similarities and differences across sectors as a way of motivating the empirical analysis to discover how varying types of aid affect terrorism. We consider five sectors of foreign aid: education, health, conflict, governance, and civil society.

Three interrelated processes potentially connect disaggregated aid to terrorism. First, aid allocated across different sectors may provide immediate relief from a host of social ills, thereby increasing human development and progress (Sen 1999) and decreasing motives for terror. Education aid, for example, may help improve human capital and thus produce more favorable social, economic, and political conditions. Education aid appears high on the list of priorities of many donors, especially since the creation of the Millennium Development Goals. There is modest evidence that education aid boosts primary school enrollments (Dreher et al. 2008; Michaelowa and Weber 2008) in ways that recipient government could not otherwise accomplish. As aid benefits education, increased education has a number of positive externalities: "schooling has a large number of direct beneficial effects beyond raising economic output ..." (Pritchett 2001: 388; cf., Dreher et al. 2008), such as increasing educational opportunity, thereby reducing the desire to support actively or tolerate passively the use of terrorism (Bueno de Mesquita 2005; Honaker 2005). As such, we expect educational aid to have a robust negative effect on terrorism.

But is there something unique about education aid? Even though prominent studies have focused primarily on education aid (Azam and Thelen 2008, 2010), other types of aid may also improve societal welfare and reduce the willingness of individuals to engage in terrorism. Health aid, for example, could have a palliative effect on terrorism. Health aid can enable children to attend school more frequently and adults can work more consistently at their jobs. A robust finding from the recent experimental literature is that deworming children— a relatively inexpensive health intervention—is highly effective at decreasing school absenteeism and has substantial positive externalities among untreated individuals (Miguel and Kremer 2004). While the macro-level literature has not found a strong relationship between health aid and standard country-level measures of health outcomes such as infant mortality (Williamson 2008), many specific health interventions are cost-effective and extraordinarily successful, such as those carried out by the Global Alliance for Vaccines and Immunization, which have saved millions of lives. Thus, we expect that foreign aid devoted to health interventions may improve quality of life, thereby reducing motivations for at least some individuals and communities to engage in terrorism.

Conflict aid may have an impact on terrorism by improving welfare through an increase in regime stability and decrease in the risks associated with developing economic openness and freedom in pre- and post-conflict situations. Bandyopadhyay et al.'s (2011a) formal model predicts that aid directly tied to counterterrorism will increase a recipient country's proactive response to terrorism and have a positive impact on regime stability. Aid has also been shown to have positive impacts on the economy in post-conflict societies if granted at the right times (Collier and Hoeffler 2004). Aid possibly increases confidence in a new regime while its absence may weaken such confidence and lead to further problems, such as what occurred in some regions of Afghanistan (Galtung and Tisne 2009). As conflict aid is effective at preventing the occurrence or recurrence of war, a number of important side effects occur. Conflict aid is believed to reduce disruptions to the educational system (Lai and Thyne 2007), which in turn may reduce terrorism. Aid may also reduce the likelihood that governments violate the human rights of their citizens (Meyer 1998; Richards et al. 2001; Pion-Berlin 1983), which then may affect subsequent levels of terrorism directed at the regime (Piazza and Walsh 2010). As such, we expect conflict aid to have a robust negative effect on terrorism.

Governance aid is a form of what is often considered democracy aid. Studies examining the effect of democracy aid on the development of democracy provide mixed results. Some have found that democracy aid is negatively associated with democracy or not statistically related at all (Brautigam and Knack 2004; Djankov et al. 2006;

Kalyvitis and Vlachaki 2008; Knack 2001, 2004). Others have found that democracy aid has a positive effect on democracy (Finkel et al. 2007), but its effect probably only holds under fairly specific conditions (Nielsen and Nielson 2011). Given the evidence against a relationship between democracy aid and democracy, it is possible that aid is effective at reducing terrorism precisely because it strengthens authoritarian leaders who effectively prevent various forms of conflict, including terrorism (Bueno de Mesquita et al. 2003).[4] We thus expect that governance aid should be negatively related to terrorism, though given mixed expectations about democracy aid and democracy, this result is likely weaker than for education and conflict aid, and possibly health aid.

Of the various sectors of aid, civil society aid may be able to target social services best. Civil society aid is less likely to be absorbed in the government's other priorities while simultaneously empowering groups likely to provide economic and social benefits as well as some nonviolent opposition to the government (Carothers and Ottaway 2000; Gugerty and Kremer 2008). Because of its focus, civil society aid may also directly empower the elements of society most opposed to violent extremism in a country, which governments cannot do on their own, and therefore reduce terrorism. By empowering local groups in civil society—both by increasing their welfare and strengthening formal avenues of opposition—extralegal behavior becomes less likely. We thus expect that more civil society aid should be associated with less terrorism.

The second process connecting foreign aid to terrorism relates to the potential fungibility of aid. Because aid has positive effects in other sectors, leaders in recipient countries can capitalize on the positive benefits produced through aid and thus direct their own resources into fighting terrorism. Aid is at least partially fungible, allowing sectoral aid to increase to some extent the ability of the government to enact preferred policies.

A series of articles by Azam and Delacroix (2006) and Azam and Thelen (2008, 2010) advances variations of an argument in which education aid is assumed to be only partially fungible in providing resources that cannot be provided by local or government resources.[5] Central to their claim, increased education aid enhances human capital and general social welfare. Because education needs are fulfilled in other ways, as are health and other needs at times, even if not directly controlled in the government budget process, a recipient government may funnel its own resources into other areas, such as counterterrorism. Whether aid is completely fungible can be investigated empirically, and we do so below.[6]

The third and final process linking aid and terrorism is related to "tied aid". Aid can be tied directly to a recipient government's counterterrorism policy (Bandyopadhyay et al. 2011a). In the tied-aid framework, donors explicitly require recipient governments to invest greater resources in counterterrorism. Such tied aid may be explicitly targeted at conflict prevention and resolution, or the aid may service others sectors with an understanding that aid is contingent on the government's increased use of counterterrorism.[7] In addition to aid

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[4]Based on a recent extreme bounds analysis, Gassebner and Luechinger (this issue) find that law and order and the respect of physical integrity rights, both of which are affected by governance aid, are negatively associated with terrorism occurring in a particular country. It is possible that democracy aid is encouraging democratization, but in ways that reduce the effects of terrorism. Fully explaining the causal connections between democracy aid and democracy is beyond the scope of this article, but we raise this alternative as a possibility.

[5]This accords with research by Dreher et al. (2008) who also make a case for the partial fungibility of aid.

[6]As an anonymous reviewer noted, if aid is completely fungible, this exercise in disaggregation would be unnecessary.

[7]Bandyopadhyay et al. (2011a) further consider a conditional role of foreign aid, contending that foreign aid's success or failure depends on homeland security measures in both donor and recipient countries, which ties

tied to counterterrorism, donors also give needed conflict prevention and resolution aid when governments cannot provide those services on their own.

Although there may be substitutable effects of different types of aid, their effects could occur on different timelines. Dreher et al. (2008) posit that the impacts of education aid need a number of years to take effect (five-year averages), but Clemens et al. (2004) place education, health, and democracy aid in a longer-term category. Thus, our expectation is that the effects in the education, health, and civil society aid sectors may occur over a longer time period than other sectors, such as conflict aid, which could have a shorter-term effect. In the empirical analysis of the article (and online appendix, http://politicalscience.byu.edu/mfindley and http://nw08.american.edu/~jyoung), we consider these different sectors and vary the lag structures.

3 Research design

Data on our dependent variable are from the ITERATE database (Mickolus et al. 2008), which captures transnational terrorist events worldwide. We consider three variations on the dependent variable: (1) the count of terrorist events occurring in the country that receives aid, (2) the count of terrorist events by perpetrators from the country receiving aid, and (3) a combined measure of domestic and transnational terrorism from the Global Terrorism Database (LaFree and Dugan 2006) based on the location of the attacks. We report only the first set of results in the main article, but we add the second and third sets of results, along with many robustness checks, to the online appendix.

3.1 Estimation

Terrorist attacks are distributed in such a way that estimation via ordinary least squares is not appropriate. We use a negative binomial regression, which accounts for the right-skewed distribution of attacks in which there is overdispersion in the observed counts. A Vuong test indicates that a zero-inflated model is not preferred to a standard negative binomial. The panel framework also requires adjusting the standard errors to capture within-unit serial correlation. We further lag all of the variables to account for time effects, including checking several different lag structures for our key independent variables. We also control for regional fixed effects and address endogeneity.

Most scholars rely on instrumental variables in a two-stage, least squares framework. The limitations of instruments in the aid literature have been well-documented by economists and political scientists (Sovey and Green 2011). Addressing the aid literature specifically, Cohen and Easterly (2009: 3) identify "The infeasibility of instrumenting for multiple RHS [right-hand side] variables", which "became a kind of magical machine churning out causal econometric results. Unfortunately, the identifying assumptions were so implausible as to leave most outside observers unconvinced." Instruments face the further problem that, even

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into a line of research on counterterrorism efforts outside of the indirect effects of aid (Arce and Sandler 2005; Enders and Sandler 2006; Sandler and Siqueira 2006). An important result regarding foreign aid for counterterrorism is that aid granted explicitly for counterterrorism should reduce the supply of terrorist attacks. Further, if recipient governments institute greater proactive measures, counterterrorism-based aid may be justified and beneficial. Because homeland security measures across the set of recipient countries is difficult to measure reliably, we do not consider this aspect of the argument directly. We conduct additional tests in our robustness checks in which aid is interacted with government repression and find that the results generally hold.

if one can find a strong instrument, it is nearly impossible to find multiple instruments to sort out the effects of different types (sectors) of aid, a task central to this article. In sum, it would be nearly impossible to find separate instruments for two or more sectors of aid.

Instead of a traditional instrumental variables approach, we use two methods. We first follow Azam and Delacroix's (2006) method, which estimates a model using each endogenous variable (aid, in this case) as the dependent variable, with exogenous regressors to predict aid.[8] After computing residuals from the first model, they are included in the model predicting terrorist attacks. This approach makes possible an explicit test for endogeneity and generates unbiased coefficients for the endogenous regressors.

As an additional sensitivity analysis, we estimate dynamic GMM models that account for endogenous regressors based on work by Arellano and Bond (1991) and Blundell and Bond (1998). Because unobserved panel-specific effects are often correlated with lagged dependent variables, a standard dynamic panel model may have inconsistent standard errors (Arellano and Bond 1991). When this situation occurs, Arellano and Bond (1991) derived an estimator that differences these time-invariant fixed effects, thus removing them, and instruments the lag using various differencing approaches (Blundell and Bond 1998). This approach is most effective when the number of time periods exceeds the number of cross-sectional units or when the number of time periods is exceptionally small (Roodman 2006). In our data, the number of countries greatly exceeds the number of years in the sample (147 to 32), and the number of time periods is reasonably long, thus reducing the need for this modeling technique. In the aid literature, Dreher et al. (2008) use the system GMM approach when dealing with endogeneity.

3.2 Independent variables

Our primary independent variable is nonmilitary foreign aid from *AidData* (Tierney et al. 2011), which is similar to Azam and Thelen (2010) and consistent with the central idea set forth in Bandyopadhyay et al. (2011a). *AidData* captures more than double the amount of aid information than the OECD's Creditor Reporting System (CRS) database and from a much larger set of donors, including donors such as South Africa and Saudi Arabia. Further, it increases the precision with which sectors of aid are measured, using over 700 sector codes across a wide variety of foreign aid purposes and activities. Following the literature, we employ data on aid commitments rather than disbursements.

Following standard practice in the aid literature, we scale aid by the recipient's GDP $\frac{Aid}{GDP}$ as well as by population $\frac{Aid}{Pop}$; we report the aid per capita results in the online appendix. Further, because aid *reporting* tends to be lumpy (aid reported in some years but not others) whereas aid flows typically occur each year, we smooth the aid data using a moving average of Aid/GDP or Aid/Population based on the previous three years plus the current year. We further vary the lag based on differential expectations across the sectors and report those tables in an online appendix but discuss them in the main text. This also fulfills the purpose

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[8]Azam and Delacroix (2006) use many of the exogenous variables from the equation predicting terrorism as well as instruments for militancy, cultural and temporal context, and educational capital. We follow their approach but use different indicators for similar concepts. To account for militancy we use measures of mountainous terrain (Fearon and Laitin 2003) and oil exports (Ross 2006), which in conflict studies have shown to increase militancy. We also use dummies for temporal periods, new states, and regions to account for specific cultural and temporal effects. Because we are predicting various kinds of aid, we do not use the measure of infant mortality. Regardless of whether we include this measure or not, the estimates are quite similar.

of capturing aid flows that take some time to be delivered and take effect.[9] The following list summarizes what each of the sectoral categories captures from the *AidData* database:

Overall aid: Overall-aid totals encompass all foreign-assistance flows that go to a recipient country in a specified year.

Education: The education sector is divided into three main groups: basic education, secondary education, and post-secondary education. Also included are activities that target system-wide improvements, such as education policy development, facilities, training, and research.

Health: The health sector covers the topics of specialized medical services, basic health and nutrition, infectious disease control, reproductive healthcare, family planning, and sexually transmitted diseases. Also included are health-specific policy development, education, training, and research.

Conflict: The conflict sector focuses on both conflict prevention and resolution. It addresses activities such as security system management, civilian peace-building efforts, land mine clearance, arms control, and reintegration of former soldiers.

Governance: The governance sector includes those projects that are designed to improve the capacity of government institutions that carry out tasks related to basic administration and public sector reform. It mainly addresses issues of economic development, public sector financial management, and judicial development over all levels of government.

Civil society: The civil society sector includes those projects that are designed to promote community participation in government decision making. This includes aid to grassroots organizations, support for the promotion of free and fair elections, human rights, democratic institutions, and funding for the free flow of information.

We incorporate a set of controls consistent with arguments and findings in the quantitative terrorism literature. Among the controls, we include Polity's executive constraints and participation measures (Li 2005), log gdp per capita in constant 2000 U.S. dollars (Findley and Young 2011; Li 2005; Li and Schaub 2004), log population (Li 2005; Young and Findley in press), armed conflict (Gleditsch et al. 2002), terror counts lagged five years (Li 2005; Mickolus et al. 2008), and regional dummies (Bennett and Stam 2000; Li 2005; Young and Dugan 2011). The online appendix includes descriptive statistics for all of the measures and a list of countries used in the estimation sample.

4 Empirical analysis

Table 1 displays the results of the most general test of the foreign aid–terrorism relationship (Models 1 and 2). The dependent variable in both models is the number of transnational attacks in an aid-recipient, country-year. The bilateral aid variables divided by GDP are the key independent variables. As the results indicate, the initial findings are not statistically different from zero. After accounting for endogeneity, the results are negative and statistically significant, implying that aid has a pacific effect, reducing terrorism overall. In the online appendix, we report a substantive effects figure, which displays the percent change in

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[9]Our own survey of more than one hundred articles on aid effectiveness indicates that there is not a standard for how long aid takes to have an effect; perhaps consequently, conventions on lagging aid in statistical models are weak. In the robustness section, we consider different lag structures, which mostly result in the same conclusion.

expected terrorist counts when increasing aid one standard deviation. As the figure shows, the substantive effects are not trivial.

Most of the control variables in this overall analysis are consistent with previous studies. As expected, democratic participation significantly decreases terrorism whereas past terrorism and civil conflict increase terrorism. After accounting for endogeneity, as will be discussed below, executive constraints becomes positive and significant, as expected, but population is no longer significant. The results of the overall measure are suggestive of an aid–terrorism relationship but they are not particularly telling because many different types of aid are aggregated together.

4.1 Foreign aid, aid sectors, and endogeneity

First, we evaluate whether aid is perfectly fungible, which would eliminate the need for disaggregation. To do so, we estimated a model with all of the sectors included in a single estimation. We then used a Wald test to determine whether the coefficients for each aid sector are statistically different. In the models without an endogeneity correction, the p value is just outside conventional significance levels (0.106). Once accounting for endogeneity, however, the Wald test confirms the need for disaggregation ($p = 0.000$).[10]

In Tables 1, 2, and 3, we investigate the impacts that different sectors of foreign aid have on transnational terrorism. Each model (Models 3 through 12) uses a different form of aid as the independent variable, and ITERATE's transnational attacks count as the dependent variable. In all cases, aid is smoothed and scaled by GDP. Because the control variable results are largely similar to previous studies, we do not discuss them here.

Table 1 (Models 3 and 4) captures aid designated for the educational sector. Without adjusting for endogeneity (Model 3), the results are negative but indeterminate. After accounting for endogeneity (Model 4), education aid has a negative influence on the count of terrorist attacks. We also control for general budget aid, which has a negative relationship but is not statistically significant. Although Azam and Thelen (2008) do not test the education aid argument directly, our analysis finds some support for this hypothesis. There is, however, no support for the second part of their argument that budget aid should enable recipient governments to carry out effective counterterrorism. Notably, on average, a one standard deviation increase in education aid is expected to decrease the count of terrorist attacks by more than 71%.[11]

Models 5 and 6 in Table 2 estimate the effect of conflict aid on terrorist attacks. Both models suggest that as conflict aid increases, counts of attacks will decline. On average, a one standard deviation increase in conflict aid is expected to decrease counts of terrorist attacks by more than 32%. Although this is not a direct test of the Bandyopadhyay et al. (2011a) argument, it suggests that the tied-aid mechanism they identify may be occurring.

The results of the analyses indicate that education aid and conflict aid are effective at reducing terrorism in recipient countries. These results thus provide some support for the arguments in past studies (Azam and Delacroix 2006; Azam and Thelen 2008, 2010; Bandyopadhyay et al. 2011a).

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[10]Pairwise comparisons are also supportive of the notion that the coefficients are different. A Wald test of whether all sectors are equal to each other and to zero also suggests disaggregation ($p = 0.069$ for base model, $p = 0.000$ for model with endogeneity fix). Details regarding these tests can be found in the online appendix.

[11]We also lagged and smoothed the data on aid by sector over seven- and ten-year periods. The results are qualitatively similar, but health and education become significant even without an endogeneity fix. This provides some support for a longer gestation period for these kinds of aid that build human capital.

Table 1 Effects of all bilateral and education aid on transnational terror attacks, 73-04

	All bilateral aid		Education aid	
	Model 1 b/se	Model 2 b/se	Model 3 b/se	Model 4 b/se
All aid/GDP	−1.063	−16.533***		
	(1.154)	(4.867)		
Ed. aid/GDP			−2.563	−277.655***
			(17.634)	(42.910)
Budget aid/GDP			0.028	−0.108
			(2.795)	(3.685)
Exec. constraints	0.021	0.098***	0.018	0.126***
	(0.032)	(0.037)	(0.033)	(0.038)
Dem. participation	−0.016***	−0.018***	−0.016***	−0.022***
	(0.004)	(0.004)	(0.004)	(0.004)
GDP	0.156**	−0.257*	0.175***	−0.395***
	(0.061)	(0.141)	(0.059)	(0.101)
Population	0.214***	0.029	0.221***	−0.027
	(0.056)	(0.074)	(0.054)	(0.074)
Conflict	0.895***	0.767***	0.899***	0.699***
	(0.160)	(0.171)	(0.159)	(0.164)
Past terror	0.129***	0.134***	0.128***	0.132***
	(0.026)	(0.025)	(0.026)	(0.024)
Europe	0.142	−0.127	0.143	−1.247***
	(0.212)	(0.225)	(0.213)	(0.327)
MENA	−0.116	0.242	−0.140	0.140
	(0.195)	(0.209)	(0.195)	(0.186)
Africa	−1.130***	−0.656**	−1.162***	−0.706***
	(0.203)	(0.263)	(0.191)	(0.215)
Asia	−0.665***	−0.521**	−0.675***	−0.581***
	(0.209)	(0.208)	(0.209)	(0.220)
Endog. bias all aid/GDP		17.226***		
		(4.984)		
Endog. bias ed. aid/GDP				295.070***
				(44.660)
Constant	0.739***	0.670***	0.739***	0.607***
	(0.086)	(0.086)	(0.086)	(0.093)
AIC	10 233	9 850	10 237	9 761
BIC	10 314	9 936	10 324	9 853

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Models 7 and 8 in Table 2 show the results for health aid. It appears that health aid also has a terror-reducing effect (a one standard deviation increase is expected to decrease terrorism by almost 39%). Taken together, these results suggest that conflict and health aid may be substitutable for education aid in their effects on aggregate violence.

Table 2 Effects of bilateral conflict and health aid on transnational terror attacks, 73-04

	Conflict aid		Health aid	
	Model 5	Model 6	Model 7	Model 8
	b/se	b/se	b/se	b/se
Conflict aid/GDP	−489.724[**]	−407.328[*]		
	(214.534)	(208.983)		
Health aid/GDP			−47.715[**]	−126.772[***]
			(19.158)	(32.356)
Budget aid/GDP	0.050	0.183	1.255	0.730
	(2.901)	(3.755)	(3.605)	(4.207)
Exec. constraints	0.024	0.110[***]	0.025	0.066[*]
	(0.032)	(0.037)	(0.032)	(0.035)
Dem. participation	−0.017[***]	−0.019[***]	−0.016[***]	−0.019[***]
	(0.004)	(0.004)	(0.004)	(0.004)
GDP	0.163[***]	0.023	0.141[**]	−0.075
	(0.057)	(0.059)	(0.062)	(0.096)
Population	0.217[***]	0.202[***]	0.210[***]	0.155[***]
	(0.055)	(0.058)	(0.055)	(0.060)
Conflict	0.907[***]	0.963[***]	0.890[***]	0.871[***]
	(0.156)	(0.175)	(0.156)	(0.164)
Past terror	0.128[***]	0.118[***]	0.129[***]	0.126[***]
	(0.025)	(0.025)	(0.026)	(0.025)
Europe	0.160	0.104	0.136	−0.353
	(0.210)	(0.220)	(0.208)	(0.272)
MENA	−0.132	0.091	−0.148	−0.136
	(0.194)	(0.186)	(0.194)	(0.194)
Africa	−1.131[***]	−1.132[***]	−1.088[***]	−1.056[***]
	(0.202)	(0.209)	(0.206)	(0.210)
Asia	−0.664[***]	−0.640[***]	−0.669[***]	−0.670[***]
	(0.209)	(0.228)	(0.206)	(0.211)
Endog. bias con. aid/GDP		142.558[***]		
		(25.905)		
Endog. bias health. aid/GDP				102.085[***]
				(30.481)
Constant	0.729[***]	0.612[***]	0.732[***]	0.664[***]
	(0.086)	(0.094)	(0.085)	(0.086)
AIC	10 221	9 771	10 225	9 831
BIC	10 308	9 863	10 312	9 923

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Finally, Table 3 presents the results for governance and civil society aid. In both cases, the measures are negative and statistically significant, indicating two more potential substitutable aid sectors. A one standard deviation increase in governance aid is expected to decrease terrorism by over 65% and a one standard deviation increase in civic aid is expected to decrease terrorism by almost 40%. Both governance and civil society aid are

Table 3 Effects of governance and civil society aid on transnational terror attacks, 73-04

| | Governance aid | | Civil society aid | |
	Model 9 b/se	Model 10 b/se	Model 11 b/se	Model 12 b/se
Gov. aid/GDP	−4.454	−124.243		
	(11.427)	(77.653)		
Civic aid/GDP			−82.945	−704.214***
			(100.099)	(168.925)
Budget aid/GDP	0.488	0.755	0.594	0.009
	(2.850)	(3.044)	(2.929)	(3.753)
Exec. constraints	0.025	0.090*	0.026	0.090**
	(0.037)	(0.052)	(0.036)	(0.040)
Dem. participation	−0.019***	−0.022***	−0.019***	−0.018***
	(0.004)	(0.004)	(0.004)	(0.004)
GDP	0.225***	−0.012	0.216***	−0.093
	(0.065)	(0.161)	(0.066)	(0.094)
Population	0.233***	0.137*	0.233***	0.217***
	(0.056)	(0.073)	(0.055)	(0.057)
Conflict	0.896***	0.843***	0.893***	0.841***
	(0.185)	(0.196)	(0.185)	(0.201)
Past terror	0.131***	0.130***	0.131***	0.135***
	(0.041)	(0.043)	(0.041)	(0.043)
Europe	0.431	0.083	0.433	0.079
	(0.284)	(0.361)	(0.284)	(0.295)
MENA	−0.114	−0.248	−0.104	−0.193
	(0.196)	(0.237)	(0.197)	(0.203)
Africa	−1.114***	−1.141***	−1.113***	−1.286***
	(0.213)	(0.217)	(0.213)	(0.219)
Asia	−0.657***	−0.636***	−0.663***	−0.736***
	(0.229)	(0.234)	(0.227)	(0.249)
Endog. bias gov. aid/Gov		125.912		
		(77.433)		
Endog. bias civic aid/GDP				748.882***
				(174.808)
Constant	0.784***	0.755***	0.784***	0.708***
	(0.099)	(0.101)	(0.099)	(0.106)
AIC	7 550	7 279	7 549	7 226
BIC	7 633	7 367	7 632	7 315

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

likely to improve social conditions generally, but they differ in that governance may enable more effective counterterrorism while civil society aid more directly affects the lives of citizens.

We also conducted additional analyses using both budget aid and agriculture aid but find that the results are not similar to the other sectors. In the case of general budget assistance,

the relationship is positive and significant, though not substantively large in the models that account for endogeneity. This result further reinforces the conclusion that general assistance may not be as effective as sector-specific aid. The results for agriculture aid are negative, similar to education, conflict, governance, and civil society, but they are not statistically significant, which indicates that not all sectors of aid serve similar purposes.

4.2 Summary of additional tests

The results are generally robust to the decision whether to divide aid by population or GDP. We estimated Models 1 through 12 using aid measures divided by population, and the findings are similar. Only conflict aid divided by population without the endogeneity fix becomes insignificant. All of the indicators that are significant when correcting for endogeneity remain significant and have similar substantive influences.

We also consider a variety of other models, including estimations using different specifications of the dependent variable, fixed effects, different lag structures, and the GMM approach to dynamic panel data with endogenous covariates. When we use the dependent variable in which attacks are based on the perpetrator's nationality, the results are still in the expected direction and statistically significant in the case of education aid but they are not significant in the conflict aid sector. In contrast, when estimating the relationship using the Global Terrorism Database, which includes both domestic and transnational attacks, the results are robust in all cases, suggesting aid is particularly effective at reducing attacks that occur in the recipient country. Fixed effects models along with results using different lag structures all continue to reflect the results reported in the main article. Finally, using a GMM estimator for endogeneity produces results that are negative, similar to the models in the main article, but they are not always statistically significant at conventional levels. The results do not attenuate dramatically (for education aid $p = 0.217$, for conflict aid $p = 0.118$, and all aid is significant at $p = 0.01$), but we also note that this estimation approach may not be necessary given the large number of temporal and cross-sectional units in the data (Roodman 2006).

5 Conclusion

The war on terror has been the most prominent security issue for the U.S. and many other developed countries since 9/11. Foreign aid has been promoted as one of the preferred strategies to fight terrorism. Decisions to boost foreign aid to fight terrorism have been based on beliefs in its efficacy in reducing acts of terrorism along with ill effects of terrorism (Bandyopadhyay et al. 2011b). Empirical examinations of the relationship are important so that policymakers will know if and how to use foreign aid to fight terrorism. We set out to test a sector-specific argument about aid, which builds on theoretical arguments in the previous literature. The primary goal of the article was to use the most comprehensive and refined data in our empirical tests in order to capture sector-level aid more precisely.

Our results indicate that aid can reduce terrorism if targeted toward the appropriate sectors. While aid targeted at education and conflict prevention/resolution had negative and statistically significant effects on terrorism, they were not unique. Indeed, other sectors of aid—health, governance, and civil society—also appear to reduce terrorism. These findings point to the need to theorize a variety of causal pathways through which aid could reduce terrorism and, further, to continue to refine empirical tests to capture these mechanisms. We anticipate that a fruitful line of inquiry involves identifying whether and how sectoral aid

affects domestic vs. transnational terrorism using the Enders et al. (2011) differentiation of domestic and transnational incidents.

Finally, aid may not have the same impact across different temporal periods. A preliminary investigation of different sectors of aid during different periods (the Cold War, the 1990s, and the Global War on Terrorism) suggests that the impact that aid has on terrorism might change depending on the nature of the international system. Future work should explain and evaluate how and why these changes occur. Our study suggests that the beneficent impact of aid is dependent upon the sector that the aid targets. This result may also be dependent upon the international context.

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